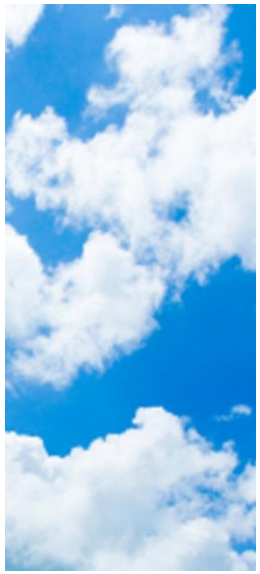
Health Effects of Air Pollution



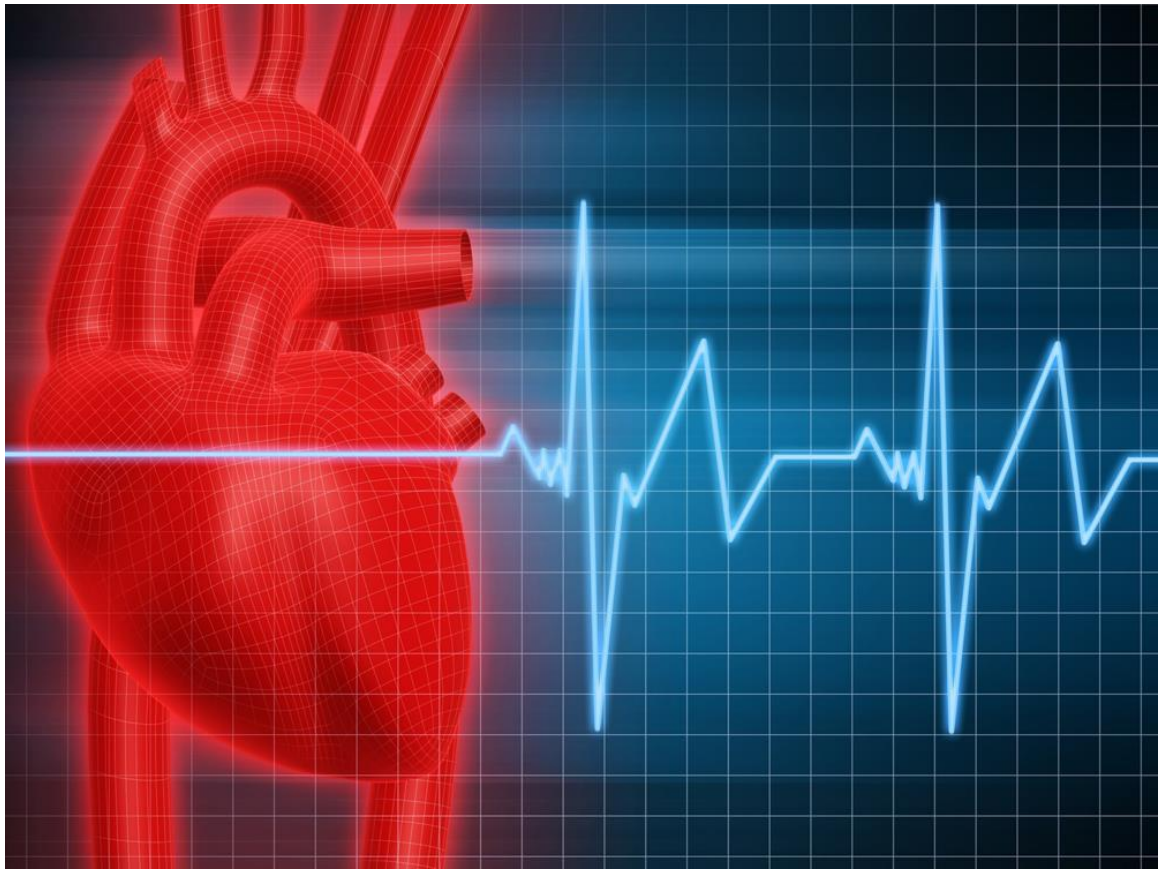
April 24, 2014

California Environmental Protection Agency

Air Resources Board

Presentation Overview

- Major Health Effects
- Vulnerable Populations
- Toxic Air Contaminants
- Air Quality Standards



MAJOR HEALTH EFFECTS

Air Pollution and Public Health

- Science on the health impacts of air pollution dates back to 1930's
- Health effects observed worldwide
- Particulate matter (PM) and ozone account for over 90% of identified health impacts
- Air pollution poses cancer risk

Mechanisms for Air Pollution Health Effects

- Air pollution exposure can:
  - Worsen existing disease
    - Cardiovascular diseases
    - Respiratory diseases
  - Cause disease
    - Cancer
    - Asthma

Major Health Effects of Air Pollution

- Premature Death
- Heart Attacks and Stroke
- Asthma
- Cancer Risk

Premature Death

- Strongest evidence for premature death from air pollution is for PM exposure
- Studies link PM to premature death in people with cardiovascular and respiratory disease
- Premature mortality from ozone exposure linked to respiratory causes

Cardiovascular Effects

- Studies show daily exposure to PM2.5, PM10, and ozone can worsen preexisting chronic cardiovascular disease

Respiratory Effects

Air pollution effects on the lungs can result in:

- Asthma exacerbation
- Increased asthma medication
- Hospitalization
- Emergency department visits

Asthma and Air Pollution

- Nearly 3 million Californians are asthmatic
  - 1 million children
  - 1.9 million adults
- 14% of San Joaquin Valley children are asthmatic
- Ozone and traffic related air pollutants shown to worsen asthma

Cancer Risk from Air Pollution

- Specific pollutants are “toxic air contaminants (TAC)” due to cancer risk
- Human epidemiological studies and animal exposure studies show air pollution is linked to cancer risk
- Peer review by mandated “Scientific Review Panel”
- ARB regulations are reducing cancer risk form TACs

VULNERABLE POPULATIONS

Who Is Especially Vulnerable to Air Pollution?

- Children
- Elderly people
- People with chronic disease
- Outdoor workers and athletes
- People in low socioeconomic communities

What Population Characteristics Influence Vulnerability?

- Childhood: more outdoor activity and higher breathing rate
- Elderly: Chronic health conditions including heart and lung disease, diabetes
- Socioeconomic status: poverty, low level of education, other environmental justice community indicators

TOXIC AIR CONTAMINANTS

Toxic Air Contaminants

- Diesel PM is the TAC posing greatest statewide cancer risk
- Other key TACs:
  - Benzene
  - 1,3-butadiene
  - Chromium
  - Chlorinated solvents

Proximity Increases Health Risk

- Risk assessments show how TACs increase health risk in neighborhoods
- ARB regulations are reducing health risk near sources of air pollution

AIR QUALITY STANDARDS

Air Quality Standards

- U.S. EPA must set National Ambient Air Quality Standards (NAAQS) based on health impacts
- Level of NAAQS is specific to each pollutant
- Required NAAQS reviews are necessary to reflect new health research
- U.S EPA NAAQS assessments are subject to scientific peer review by the Clean Air Scientific Advisory Committee (CASAC)

Nature of NAAQS

- Level of NAAQS designed to:
  - protect public from short and long term air pollution exposure
  - protect sensitive populations
- NAAQS are a mandatory public health goal to be met by specific deadlines
- States must demonstrate how NAAQS will be met

Ongoing Scientific Studies

- Improve understanding of:
  - Multi-pollutant exposures
  - Near source exposures
  - Impacts on vulnerable populations
  - Role of genetics

Summary

- Health impacts of air pollution include:
  - Premature death
  - Heart disease and stroke
  - Asthma
  - Cancer risk
- California's improving air quality is providing public health benefits
- Meeting NAAQS and reducing risk from TACs requires ongoing new emission reductions

Our Goal:
Clean Air in all communities